DETAILED ACTION

Status of the Claims

Claims 1-2, 21-22, 24, 26, 29, 31-35, 37 and 39 are pending wherein claims 1-2, 33 and 37 are amended and claims 3-20, 23, 25, 27-28, 30, 36 and 38 are canceled.

Status of Previous Rejections

The previous rejection of claims 1 and 32-33 under 35 U.S.C. 103(a) as being unpatentable over Gondo et al. (US 3,574,6025) alone, or alternatively with evidence from the ASM Handbook Volume 1 is withdrawn in view of the Applicant's amendment to claim 1. The previous rejection of claim 1 under 35 U.S.C. 103(a) as being unpatentable over Gondo et al. (US 3,574,602), and further in view of Lyon (US 2,942,339) is withdrawn in view of the Applicant's amendment to claim 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 24, 31-35 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beguinot (US 5,695,576) alone, or alternatively with evidence from the ASM Handbook Volume 1.

In regards to claim 1, Beguinot (‘576) discloses an alloy steel composition

with high tensile strength and excellent ductility having a composition in comparison with that of the instant invention as shown in the table below (abstract).

Element	From Instant Claims (weight percent)	Beguinot ('576) (weight percent)	Overlap (weight percent)
C	about 0.16 – about 0.35	0.15 – 0.35	about 0.16 – 0.35
Mn	0 – about 0.85	0.1 – 4.5	0.1 – about 0.85
Si	0 – about 1.25	0 – 3	0 – about 1.25
Cr	about 1.50 – about 3.25	0 – 6	about 1.50 – about 3.25
Ni	0 – about 5.00	0 – 9.00	0 – 9.00
Mo	0 – about 0.55	0 – 3.00	0 – about 0.55
W	1.17 – about 3.25	0 – 6	1.17 – about 3.25
V	about 0.05 – about 0.30	0 – 5	about 0.05 – about 0.30
Cu	0 – about 0.50	0	0
P	0 – about 0.015	impurity	impurity
S	0 – about 0.012	impurity	impurity
Ca	0 – about 0.02	0 – 0.2	0 – about 0.02
N	0 – about 0.14	0 – 0.30	0 – about 0.14
Al	0 – about 0.05	0 – 3	0 – about 0.05
Fe	Essential Balance	Essential Balance	Essential Balance

Beguinot ('576) discloses an alloy steel composition that does not necessitate the addition of phosphorus and sulfur as shown above, but Beguinot ('576) does not specify the contents of the impurity elements such as phosphorus and sulfur.

The ASM Handbook Volume 1 discloses that steel intended for forming, drawing, or bending would have phosphorus and sulfur contents less than 0.035 weight percent and less than 0.040 weight percent in order to prevent cracking or splitting (pg. 577, col. 1).

Therefore, it would expected that the alloy steel, as disclosed by Beguinot ('576), would have phosphorus and sulfur contents less than 0.035 weight percent and less than 0.040 weight percent, as disclosed by the ASM Handbook Volume 1, in order to prevent cracking or splitting, as disclosed by the ASM Handbook Volume 1 (pg. 577,

col. 1).

The Examiner notes that the ranges disclosed by Beguinot ('576) alone, or alternatively with evidence from the ASM Handbook Volume 1 for carbon, manganese, silicon, chromium, nickel, molybdenum, tungsten, vanadium, copper, phosphorus, sulfur, calcium, nitrogen, and aluminum in the low alloy steel are within the ranges claimed of the instant invention, which is prima facie evidence of obviousness. MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the claimed ranges from the ranges disclosed by Beguinot ('576) alone, or alternatively with evidence from the ASM Handbook Volume 1 because Beguinot ('576) alone, or alternatively with evidence from the ASM Handbook Volume 1 disclose the same utility throughout the disclosed ranges.

With respect to limitations of the alloy steel having an ultimate tensile strength of 233-270 ksi, Charpy V-notch impact strength of 20-43 ft-lb at -40°F, and a ductility high rate strain-to-failure of 16.6 % to about 18.4% of claim 1, Beguinot ('576) with evidence from the ASM Handbook Volume 1 discloses an overlapping composition, a substantially similar method of production, and tensile strengths from above 1200 MPa (174 ksi) up to 1945 MPa (282 ksi) (col. 2, lines 1-5 and col. 8, lines 20-45). Therefore, a Charpy V-notch impact strength of 20-43 ft-lb at -40°F, and a ductility low rate strain-to-failure of 16.6 % to about 18.4% would be expected. MPEP 2112.01 I.

With respect to the limitations "wherein said steel has an ultimate tensile strength level of about 244 ksi" of claim 32, "wherein said steel has an ultimate tensile strength level of 234 ksi" of claim 33, "wherein said steel has an ultimate tensile strength level of

about 270 ksi" of claim 34, and "wherein said steel has an ultimate tensile strength level of about 248 ksi" of claim 35, Beguinot ('576) with evidence from the ASM Handbook Volume 1 discloses an overlapping composition, a substantially similar method of production, and tensile strengths from above 1200 MPa (174 ksi) up to 1945 MPa (282 ksi) (col. 2, lines 1-5 and col. 8, lines 20-45). Therefore, these tensile strengths would be expected. MPEP 2112.01 I.

In regards to claim 24, Beguinot ('576) discloses alloy steel with high tensile strength and excellent ductility having a composition in comparison with that of the instant invention as shown in the table below (abstract).

Element	From Instant Claims (weight percent)	Beguinot ('576) (weight percent)	Overlap (weight percent)
C	about 0.28	0.15 – 0.35	about 0.28
Mn	0 – about 0.85	0.1 – 4.5	0.1 – 0.85
Si	about 1.00	0 – 3	about 1.00
Cr	about 1.50 – about 3.25	0 – 6	about 1.50 – about 3.25
Ni	about 1.03	0 – 9	about 1.03
Mo	0 – about 0.55	0 – 3	0 – about 0.55
W	about 1.17	0 – 6	about 1.17
V	about 0.05 – about 0.30	0 – 5	about 0.05 – about 0.30
Cu	0 – about 0.50	0 – 0.50	0
P	0 – about 0.015	impurity	impurity
S	0 – about 0.012	impurity	impurity
Ca	about 0.02	0 – 0.20	about 0.02
N	0 – about 0.14	0 – 0.30	0 – about 0.14
Al	0 – about 0.05	0 – 3	0 – about 0.05
Fe	Balance	Balance	Balance

Beguinot ('576) discloses an alloy steel as shown above that does not necessitate the addition of phosphorus or sulfur. However, Beguinot ('576) does not specify the contents of impurity elements such as phosphorus and sulfur.

The ASM Handbook Volume 1 discloses that steel intended for forming, drawing,

or bending would have phosphorus and sulfur contents less than 0.035 weight percent and less than 0.040 weight percent in order to prevent cracking or splitting (pg. 577, col. 1).

Therefore, it would expected that the alloy steel, as disclosed by Beguinot ('576), would have phosphorus and sulfur contents less than 0.035 weight percent and less than 0.040 weight percent, as disclosed by the ASM Handbook Volume 1, in order to prevent cracking or splitting, as disclosed by the ASM Handbook Volume 1 (pg. 577, col. 1).

The Examiner notes that the ranges disclosed by Beguinot ('576) with evidence from the ASM Handbook Volume 1 for carbon, manganese, silicon, chromium, nickel, molybdenum, tungsten, vanadium, copper, phosphorus, sulfur, calcium, nitrogen, and aluminum in the low alloy steel are within the ranges claimed of the instant invention, which is a prima facie case of obviousness exists. MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the claimed ranges from the ranges disclosed by Beguinot ('576) with evidence from the ASM Handbook Volume 1 because Beguinot ('576) with evidence from the ASM Handbook Volume 1 disclose the same utility throughout the disclosed ranges.

With respect to limitations of the alloy steel having an ultimate tensile strength of about 233-270 ksi and a Charpy V-notch impact strength of 20-43 ft-lb at -40°F of claim 24; an ultimate tensile strength level of about 247 ksi of claim 31; and a ductility low rate strain-to-failure of 16.6 to about 18.4% of claim 37, Beguinot ('576) with evidence from the ASM Handbook Volume 1 discloses an overlapping composition, a substantially

similar method of production, and tensile strengths from above 1200 MPa (174 ksi) up to 1945 MPa (282 ksi) (col. 2, lines 1-5 and col. 8, lines 20-45). Therefore, ultimate tensile strengths of about 233-270 ksi; a Charpy V-notch impact strength of about 20-43 ft-lb at -40°F, and a ductility low rate strain-to-failure of 16.6 to about 18.4%. MPEP 2112.01 I.

Claims 2, 29 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beguinot (US 5,695,576) alone, or alternatively with evidence from the ASM Handbook Volume 1, in view of Yoshie et al. (US 5,454,883).

Claims 2, 29 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beguinot (US 5,695,576) alone, or alternatively with evidence from the ASM Handbook Volume 1, in view of Yoshie et al. (US 5,454,883).

In regards to claims 2 and 39, Beguinot ('576) discloses an alloy steel composition with high tensile strength and excellent ductility having a composition in comparison with that of the instant invention as shown in the table below (abstract).

Element	**From Instant Claims (weight percent)**	**Beguinot ('576) (weight percent)**	**Overlap (weight percent)**
C	about 0.28	0.15 – 0.35	about 0.28
Mn	about 0.74	0.1 – 4.5	about 0.74
Si	about 1.00	0 – 3	about 1.00
Cr	about 2.75	0 – 6	about 2.75
Ni	about 1.03	0 – 9	about 1.03
Mo	about 0.36	0 – 3	about 0.36
W	about 1.17	0 – 6	about 1.17
V	about 0.06	0 – 5	about 0.06
Cu	about 0.10	-	-
P	about 0.012	impurity	impurity
S	about 0.003	impurity	impurity
Element	**From Instant Claims**	**Beguinot ('576)**	**Overlap**

	(weight percent)	(weight percent)	(weight percent)
Ca	about 0.02	0 – 0.20	about 0.02
N	about 0.0073	0 – 0.30	about 0.0073
Al	about 0.011	0 – 3	about 0.011
Fe	Essential Balance	Essential Balance	Essential Balance

Beguinot ('576) discloses an alloy steel as shown above that does not necessitate the addition of phosphorus or sulfur. However, Beguinot ('576) does not specify the contents of impurity elements such as phosphorus and sulfur.

The ASM Handbook Volume 1 discloses that steel intended for forming, drawing, or bending would have phosphorus and sulfur contents less than 0.035 weight percent and less than 0.040 weight percent in order to prevent cracking or splitting (pg. 577, col. 1).

Therefore, it would expected that the alloy steel, as disclosed by Beguinot ('576), would have phosphorus and sulfur contents less than 0.035 weight percent and less than 0.040 weight percent, as disclosed by the ASM Handbook Volume 1, in order to prevent cracking or splitting, as disclosed by the ASM Handbook Volume 1 (pg. 577, col. 1).

Beguinot ('576) alone, or alternatively with evidence from the ASM Handbook Volume 1 disclose a steel alloy as shown above that would be rapidly cooled to form martensite (col. 6, lines 15-45), but Beguinot ('576) alone, or alternatively with evidence from the ASM Handbook Volume 1 do not specify the addition of copper.

Yoshie et al. ('883) discloses that copper, nickel, chromium, molybdenum, and tungsten would be equivalent in improving the quench-hardenability of steel in an analogous steel alloy composition (col. 11, lines 1-35 and col. 15, line 61 – col. 16, line

3).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute copper for molybdenum, nickel, chromium, or tungsten, as disclosed by Yoshie et al. ('883), within the ranges of molybdenum, nickel, chromium, or tungsten specified for the steel alloy, as disclosed by Beguinot ('576) alone, or alternatively with evidence from the ASM Handbook Volume 1, because copper, nickel, chromium, molybdenum, and tungsten would be equivalent in improving quench-hardenability, as disclosed by Yoshie et al. ('883) (col. 11, lines 1-35 and col. 15, line 61 – col. 16, line 3). See MPEP 2144.06.

With respect to limitations of the alloy steel having an ultimate tensile strength of about 233-270 ksi, about 244-270 ksi and a Charpy V-notch impact strength of about 20-43 ft-lb at -40°F of claims 2, 29 and 39, Beguinot ('576) with evidence from the ASM Handbook Volume 1 discloses an overlapping composition, a substantially similar method of production, and tensile strengths from above 1200 MPa (174 ksi) up to 1945 MPa (282 ksi) (col. 2, lines 1-5 and col. 8, lines 20-30). Therefore, a Charpy V-notch impact strength of about 20-43 ft-lb at –40°F would be expected. MPEP 2112.01 I.

Claims 21 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beguinot (US 5,695,576) alone, or alternatively with evidence from the ASM Handbook Volume 1, and further in view of Lyon (US 2,942,339).

In regards to claims 21 and 26, Beguinot ('576), or alternatively with evidence from the ASM Handbook Volume 1 discloses a steel alloy as shown above having high tensile strength, but Beguinot ('576), or alternatively with evidence from the ASM

Handbook Volume 1 do not specify using the steel as a bomb casing material.

Lyon ('339) discloses that low-carbon steels having high strength and ductility are conventionally used for making bomb casings (col. 2, lines 40-50).

Because Beguinot ('576), or alternatively with evidence from the ASM Handbook Volume 1 teach low-carbon steels having strength and ductility, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the low-carbon steel, as disclosed by Beguinot ('576), or alternatively with evidence from the ASM Handbook Volume 1, as a bomb casing, as disclosed by Lyon ('339), because Lyon ('339) discloses that low-carbon steels having high strength and ductility are conventionally used for making bomb casings (col. 2, lines 40-50).

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Beguinot (US 5,695,576) alone, or alternatively with evidence from the ASM Handbook Volume 1, in view of Yoshie et al. (US 5,454,883), and further in view of Lyon (US 2,942,339).

In regards to claim 22, Beguinot ('576), or alternatively with evidence from the ASM Handbook Volume 1, in view of Yoshie et al. ('883) discloses a steel alloy as shown above having high tensile strength, but Beguinot ('576), or alternatively with evidence from the ASM Handbook Volume 1 do not specify using the steel as a bomb casing material.

Lyon ('339) discloses that low-carbon steels having high strength and ductility are conventionally used for making bomb casings (col. 2, lines 40-50).

Because Beguinot ('576), or alternatively with evidence from the ASM Handbook Volume 1, in view of Yoshie et al. ('883) discloses low-carbon steels having

strength and ductility, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the low-carbon steel, as disclosed by Beguinot (JP '738), or alternatively with evidence from the ASM Handbook Volume 1, in view of Yoshie et al. ('883), as a bomb casing, as disclosed by Lyon ('339), because Lyon ('339) discloses that low-carbon steels having high strength and ductility are conventionally used for making bomb casings (col. 2, lines 40-50).

Response to Arguments

Applicant's arguments filed 27 March 2006 have been fully considered but they are not persuasive.

First, the Applicant primarily argues that the combination of high tensile strength and high ductility are not demonstrated by the Beguinot ('576) alloys. This is not persuasive because the normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of the percentages disclosed by Beguinot ('576) alone or alternatively with evidence from the ASM Handbook Volume 1 or Beguinot ('576) alone or alternatively with evidence from the ASM Handbook Volume 1 in view of Yoshie et al. ('883). MPEP 2144.05 II.

Second, the Applicant primarily argues that the steels described in Yoshie et al. ('883) would be tempered at significantly higher temperatures to produce alloys having lower strength levels. In response, this is not persuasive because Yoshie et al. ('883) discloses producing steel plates having tensile strengths of 60 kg/mm^2 or higher (col.

14, lines 5-9). Furthermore, the Applicant has not shown that the tempering of Yoshie ('883) would necessarily result in lower strength levels.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessee Roe whose telephone number is (571) 272-5938. The examiner can normally be reached on Monday-Friday 7:30 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/John P. Sheehan/
Primary Examiner, Art Unit 1793

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